WHAT IS CLAIMED IS:

1. A winding mechanism comprising:

a sheet material;

a winding shaft attached to one end of the sheet material;

a force application device that always applies a force to the winding shaft in a normal direction in which the sheet material is wound around the winding shaft; and

a braking device that applies a braking force to the winding shaft only in the normal direction.

2. A winding mechanism according to claim 1, wherein the braking device comprises:

an inner revolution member that is attached to the winding shaft and rotatable in unison with rotations of the winding shaft, the inner revolution member including concave sections that recede toward a center of rotation;

an outer revolution member that is rotatable and generally encircles the inner revolution member, the outer revolution member defining an inner wall section that is provided with an arcuate rack section;

planetary gear members that are stored in the concave sections of the inner revolution member and engage the arcuate rack section;

a case member that stores the outer revolution member; and

a viscous fluid that fills a gap formed between the outer revolution

member and the case member, wherein rotations of the planetary gears are restricted when the inner revolution member is rotated in the normal direction by rotations of the winding shaft in the normal direction.

3. A winding mechanism according to claim 1, wherein the braking device is provided at each of two end sections of the winding shaft.

4. A winding mechanism according to claim 2, wherein the inner revolution member includes a corner section that stops rotations of the planetary gears when the inner revolution member is rotated in the normal direction by rotations of the winding shaft in the normal direction.

5. A winding mechanism according to claim 4, wherein the corner section is formed between each of the concave sections and an outer circumferential surface of the inner revolution member.

6. A winding mechanism according to claim 4, wherein the corner section does not restrict rotations of the planetary gears when the inner revolution member is rotated in a reverse direction in which the sheet material wound is unwound.

7. A winding mechanism according to claim 2, wherein each of the concave sections formed in the inner revolution member includes an arcuate

curved surface, a straight surface section and a corner section between the arcuate curved surface and the straight surface section, wherein the straight surface section pushes each of the planetary gears and the corner section stops rotations of each of the planetary gears when the inner revolution member is rotated in the normal direction by rotations of the winding shaft in the normal direction.

8. A winding mechanism according to claim 7, wherein the outer revolution member and the inner revolution member rotate in unison in the normal direction when the winding shaft is rotated in the normal direction.

9. A winding mechanism according to claim 8, wherein the viscous fluid brakes rotations in the normal direction of the outer revolution member and the inner revolution member when the outer revolution member is rotated.

10. A winding mechanism according to claim 7, wherein the arcuate curved surface pushes each of the planetary gears and the corner section does not restrict rotations of the planetary gears when the inner revolution member is rotated in a reverse direction in which the sheet material wound is unwound.

11. A braking device for a winding mechanism that winds a sheet

material around a winding shaft, the braking device comprising:

an inner revolution member that is connectable to the winding shaft and includes concave sections that recede toward a center of rotation;

an outer revolution member that is rotatable and generally encircles the inner revolution member, the outer revolution member defining an inner wall section that is provided with an arcuate rack section;

planetary gear members that are stored in the concave sections of the inner revolution member and engage the arcuate rack section;

a case member that stores the outer revolution member; and

a viscous fluid that fills a gap formed between the outer revolution member and the case member, wherein rotations of the planetary gears are restricted only when the inner revolution member is rotated in a normal direction in which the sheet material is wound around the winding shaft.

12. A braking device according to claim 11, wherein the inner revolution member includes a corner section that stops rotations of the planetary gears when the inner revolution member is rotated in the normal direction by rotations of the winding shaft in the normal direction.

13. A braking device according to claim 12, wherein the corner section is formed between each of the concave sections and an outer circumferential surface of the inner revolution member.

14. A braking device according to claim 12, wherein the corner section does not restrict rotations of the planetary gears when the inner revolution member is rotated in a reverse direction in which the sheet material wound is unwound.

15. A braking device according to claim 11, wherein each of the concave sections formed in the inner revolution member includes an arcuate curved surface, a straight surface section and a corner section between the arcuate curved surface and the straight surface section, wherein the straight surface section pushes each of the planetary gears and the corner section stops rotations of each of the planetary gears when the inner revolution member is rotated in the normal direction.

16. A braking device according to claim 15, wherein the outer revolution member and the inner revolution member rotate in unison in the normal direction.

17. A braking device according to claim 16, wherein the viscous fluid brakes rotations in the normal direction of the outer revolution member and the inner revolution member.

18. A braking device according to claim 15, wherein the arcuate curved surface pushes each of the planetary gears and the corner section

does not restrict rotations of the planetary gears when the inner revolution member is rotated in a reverse direction in which the sheet material wound is unwound.

19. A winding mechanism comprising:

a cylindrical winding shaft;

a sheet material attached to the winding shaft;

a force application device that is provided at one end of the winding shaft and always applies a force to the winding shaft in a normal direction in which the sheet material is wound around the winding shaft; and

a braking device that is provided at another end of the winding shaft and applies a braking force to the winding shaft only in the normal direction,

wherein the braking device comprises: an inner revolution member having a protruded section that is inserted in and affixed to the cylindrical winding shaft, the inner revolution member being rotatable in unison with rotations of the winding shaft, and including concave sections that recede toward a center of rotation; an outer revolution member that is rotatable and generally encircles the inner revolution member, the outer revolution member defining an inner wall section that is provided with an arcuate rack section; planetary gear members that are stored in the concave sections of the inner revolution member and engage the arcuate rack section; a case member that stores the outer revolution member; and a viscous fluid that fills a gap formed between the outer revolution member and the case

member, wherein rotations of the planetary gears are restricted when the inner revolution member is rotated in the normal direction by rotations of the winding shaft in the normal direction.

20. A winding mechanism according to claim 19, wherein the inner revolution member includes a corner section that stops rotations of the planetary gears when the inner revolution member is rotated in the normal direction by the winding shaft rotating in the normal direction.

21. A winding mechanism according to claim 20, wherein the corner section is formed between each of the concave sections and an outer circumferential surface of the inner revolution member.

22. A winding mechanism according to claim 20, wherein the corner section does not restrict rotations of the planetary gears when the inner revolution member rotates in a reverse direction in which the sheet material wound is unwound.

23. A winding mechanism according to claim 19, wherein each of the concave sections formed in the inner revolution member includes an arcuate curved surface, a straight surface section and a corner section between the arcuate curved surface and the straight surface section, wherein the straight surface section pushes each of the planetary gears and

the corner section stops rotations of each of the planetary gears when the inner revolution member rotates in the normal direction.

24. A winding mechanism according to claim 23, wherein the outer revolution member and the inner revolution member rotate in unison in the normal direction.

25. A winding mechanism according to claim 24, wherein the viscous fluid brakes rotations in the normal direction of the outer revolution member, the inner revolution member and the winding shaft.

26. A winding mechanism according to claim 23, wherein the arcuate curved surface pushes each of the planetary gears and the corner section does not restrict rotations of the planetary gears when the inner revolution member rotates in a reverse direction in which the sheet material wound is unwound.